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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,625	03/31/2004	Kaori Saito	50024-034	3850

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Washington, DC 20005-3096

EXAMINER
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YAMNITZKY, MARIE ROSE

ART UNIT	PAPER NUMBER
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1774

DATE MAILED: 07/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/813,625

Applicant(s)

SAITO, KAORI

Examiner

Marie R. Yamnitzky

Art Unit

1774

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-11 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

Art Unit: 1774

1. Acknowledgment is made of applicant's claim for foreign priority based on applications filed in Japan on March 31, 2003 and March 25, 2004. It is noted, however, that applicant has not filed a certified copy of the JP 2003-097303 and JP 2004-088149 applications as required by 35 U.S.C. 119(b).

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 4-8 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikehira et al. (US 2002/0193532 A1).

Ikehira et al. disclose polymeric light emitting substances for use in the light emitting layer of an organic light emitting device. The substances contain an metal complex structure. Exemplary metal complex structures include iridium phenylpyridine structures. For example,

see the first formula in paragraph [0017] and the first four formulae in paragraph [0044]. The substances may also contain boron. For example, see the third formula in paragraph [0078]. See paragraphs [0175]-[0183] for exemplary device structures.

Any polymer comprising the metal complex structure represented by the first formula in paragraph [0017] and comprising the boron-containing structure set forth in paragraph [0078], or any polymer comprising a repeating unit represented by any of the first four formulae in paragraph [0044] and comprising the boron-containing structure set forth in paragraph [0078], meets the limitations of a compound having a molecular structure expressed by formula (1) as defined in present claims 1, 4-6, 8 and 11. The present claim language of “substituent containing boron” does not require that the boron be directly attached to either ring of the phenylpyridine ligand, and does not limit the size of the substituent containing boron.

One of ordinary skill in the art at the time of the invention would have been motivated to make polymeric light emitting substances comprising an iridium phenylpyridine structure by Ikehira's disclosure of such structures among the preferred structures. While Ikehira et al. do not disclose a specific example of a polymeric light emitting substance comprising the boron-containing structure and an iridium phenylpyridine structure, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make various polymeric light emitting substances suggested by the prior art. Ikehira's teachings in paragraph [0078] clearly suggest the incorporation of a boron-containing structure into the polymeric light emitting substances.

Further with respect to present claim 7, in which the boron-containing substituent must be at R2, Ikehira's repeating units of the first four formulae in paragraph [0044] would provide position isomers of the presently claimed compound. Polymeric light emitting substances comprising one of these repeating units wherein each R represents hydrogen, and a boron-containing structure as taught in paragraph [0078], are compounds represented by present formula (1) wherein R1, R2 and R4 to R8 are each a hydrogen atom, and R3 is a substituent containing boron. Absent a showing of superior/unexpected results commensurate in scope with the claims, it is the examiner's position that it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to utilize position isomers of the repeating units disclosed in paragraph [0044] of the prior art, particularly given the fact that Ikehira et al. do not limit the position on the phenylpyridine structure of the first formula in paragraph [0017] that provides attachment to the remainder of the polymeric structure, and with the expectation that position isomers would have similar properties and could be used for the same purpose.

5. Claims 1, 4-6 and 8-11 are rejected under 35 U.S.C. 102(a) as being anticipated by WO 2004/003053 A1.

US 2005/0170202 A1 is in the same patent family as WO 2004/003053 A1. The US publication is utilized by the examiner as a translation of the WO publication. The US publication is not available as prior art.

The publication date for the WO '053 reference is between the filing dates of present applicant's two foreign priority applications. Applicant cannot rely upon the foreign priority

papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

WO '053 discloses polymeric light emitting substances for use in the light emitting layer of an organic light emitting device. The substances contain a boron-containing structure. For example, see formula (1) in the abstract and on page 1, and see the boron-containing structures on pages 10-18, 20 and 21.

The polymeric light emitting substance may be a copolymer comprising a repeating unit containing a metal complex structure such as when the polymer is a copolymer comprising a repeating unit of formula (4), (5) or (6) wherein Ar<sub>1</sub> (and/or Ar<sub>2</sub> and/or Ar<sub>3</sub>, in the case of formula (5)) is a divalent group having a metal complex structure. An iridium phenylpyridine structure is disclosed as an exemplary metal complex structure. For example, see page 21, line 16-p. 22, l. 8, p. 32, l. 14-15 and formula 126 on p. 33 of WO '053. (See paragraphs [0055]-[0056] and [0075] of US '202 for the corresponding English language text.) See p. 57, line 6-p. 58, l. 21 of WO '053 (and paragraphs [0171]-[0177] of US '202) for a description of device structure and light emitting layer composition.

Any copolymer comprising the boron-containing structure required by WO '053 and a repeating unit of formula (4), (5) or (6) wherein Ar<sub>1</sub> (and/or Ar<sub>2</sub> and/or Ar<sub>3</sub>, in the case of formula (5)) is a divalent group represented by formula 126 on p. 33 of WO '053 meets the limitations of a compound having a molecular structure expressed by formula (1) as defined in present claims 1, 4-6 and 8-11. The present claim language of "substituent containing boron"

does not require that the boron be directly attached to either ring of the phenylpyridine ligand, and does not limit the size of the substituent containing boron.

One of ordinary skill in the art at the time of the invention would have been motivated to make polymeric light emitting substances comprising a boron-containing structure and an iridium phenylpyridine structure based on the teachings of WO '053. WO '053 requires a boron-containing structure and teaches that an iridium phenylpyridine structure such as that of formula 126 can be incorporated into the polymer with the boron-containing structure. While WO '053 does not disclose a specific example of a polymeric light emitting substance comprising the boron-containing structure and an iridium phenylpyridine structure, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make various polymeric light emitting substances suggested by WO '053. The disclosure of formula 126 in WO '053 clearly suggests the incorporation of an iridium phenylpyridine structure into the polymeric light emitting substances containing a boron-containing structure.

Further with respect to present claim 7, in which the boron-containing substituent must be at R2, formula 126 of WO '053 would provide position isomers of the presently claimed compound. Polymeric light emitting substances according to WO '053 comprising the formula 126 structure wherein each R represents hydrogen are compounds represented by present formula (1) wherein R1, R2 and R4 to R8 are each a hydrogen atom, and R3 is a substituent containing boron. Absent a showing of superior/unexpected results commensurate in scope with the claims, it is the examiner's position that it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to utilize position isomers of the formula 126

structure, with the expectation that position isomers would have similar properties and could be used for the same purpose.

Further with respect to claims 9 and 10, WO '053 teaches that the light emitting layer may comprise a hole transport material and/or electron transport material in addition to the polymeric light emitting substance. The amount of polymeric light emitting substance in the light emitting layer may be within the range set forth in claim 9 (see p. 57, l. 18-p. 58, l. 1 of WO '053 and paragraph [0176] of US '202). The additional materials included in the light emitting layer may be selected from known compounds. WO '053 does not explicitly disclose the compound represented by formula (3) in claim 10, but this compound is well-known in the art and is often used as a hole-transporting host material for phosphorescent metal complexes such as iridium phenylpyridine complexes. It would have been within the level of general skill of a worker in the art at the time of the invention to select suitable materials to be mixed in a light emitting layer with the polymeric light emitting substance of WO '053.

6. Claims 1, 2, 4-8 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 03/084973 A1.

US 2005/0147843 A1 is in the same patent family as WO 03/084973 A1. The US publication is utilized by the examiner as a translation of the WO publication. The US publication is not available as prior art.

The publication date for the WO '973 reference is between the filing dates of present applicant's two foreign priority applications. Applicant cannot rely upon the foreign priority



papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

WO '973 discloses metal complexes for use in the light emitting layer of an organic light emitting device. Exemplary metal complex structures include iridium phenylpyridine structures. For example, see the first formula on page 5 of WO '973. In a metal complex represented by the first formula on p. 5, at least one R must represent a group represented by formula (1) or formula (2). For example, see p. 2, l. 11-p. 3, l. 17 and p. 10, l. 1-14 of WO '973. (See paragraphs [0006]-[0008] and [0018] of US '843 for the corresponding English language text.) In the group represented by formula (1), -A- may be a group of the formula -B(R')-. In the group represented by formula (2), -D- may be a group of the formula -B(R')-. For example, see p. 18, l. 6-14 in WO '973 (and paragraphs [0045]-[0046] in US '843). When -A- or -D- is a group of the formula -B(R')-, the corresponding substituent represented by formula (1) or (2) is a substituent containing boron, which is represented by formula (2) as defined in present claim 2.

A metal complex having the structure represented by the first formula on p. 5 of WO '973 wherein at least one R represents a group represented by formula (1) wherein -A- is a group of the formula -B(R')-, or wherein at least one R represents a group represented by formula (2) wherein -D- is a group of the formula -B(R')-, meets the limitations of a compound having a molecular structure expressed by formula (1) as defined in present claims 1, 2, 4-6, 8 and 11. Further, such a compound wherein R at the position corresponding to present R2 on one, two or all three of the phenylpyridine ligands represents the group represented by formula (1) or

Art Unit: 1774

(2), and all other R's represent hydrogen, meets the limitations of a compound according to present claim 7.

One of ordinary skill in the art at the time of the invention would have been motivated to make metal complexes having an iridium phenylpyridine structure based on the teachings of WO '973. While WO '973 does not disclose a specific example of an iridium phenylpyridine complex comprising the substituent of formula (1) or (2) wherein –A– or –D– is a group of the formula –B(R')–, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make various metal complexes suggested by WO '973. The teachings in WO '973 clearly suggest the substitution of an iridium phenylpyridine complex of present formula (1) with a boron-containing substituent within the scope of a substituent represented by present formula (2).

7. Miscellaneous:

A period needs to be inserted at the end of each of claims 1, 2, 8, 10 and 11.

The examiner suggests changing “for” to --of-- in the last line of claim 9, as a grammatical correction.

8. Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Art Unit: 1774

9. The references made of record and not relied upon are considered pertinent to applicant's disclosure.

JP 2005-100881 A, US 2005/0025995 A1 (Cheng et al.) and US 2006/0134459 A1 (Huo et al.) do not represent prior art, but are of interest as anticipating or suggesting compounds represented by formula (1) as defined in at least present claims 1, 8 and 11, and teaching their use in an organic light emitting device. In particular, see formula HB-5 and HB-7 on pages 30-31 of the JP document, see paragraphs [0008]-[0011] and [0078] in Cheng's published application, and see paragraphs [0017]-[0022] and [0028] in Huo's published application.

10. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

MRY  
July 24, 2006



MARIE YAMNITZKY  
PRIMARY EXAMINER

1774